

What is claimed is:

**CLAIMS**

1. An apparatus for measuring the characteristics of radio frequency  
5 energy in an industrial radio frequency processing system comprising:  
a plurality of generator means for generating a plurality of power  
outputs onto a single transmission means, at a plurality of frequencies, each  
one of said plurality of outputs having associated characteristics; and  
common detection means for detecting said associated  
10 characteristics of said plurality of outputs, said common detection means  
comprising means for sensing said associated characteristics of a first  
generated output at a first frequency, alternating to a second frequency, and  
sensing said associated characteristics of said second generated output at said  
second frequency.  
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2. The apparatus of claim 1, wherein said radio frequency processing  
system comprises a semi-conductor processing system.
3. The apparatus of claim 1, wherein said radio frequency processing  
20 system comprises an optical disk processing system.
4. The apparatus of claim 1, wherein said associated characteristics of said  
plurality of said outputs comprises voltage, current, and phase.

5. The apparatus of claim 1, further comprising a combining means operatively connected to said plurality of generator means for combining said plurality of outputs onto a single transmission means.

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6. The apparatus of claim 1, wherein said plurality of generator means comprises two generator means, and said plurality of frequencies comprises two frequencies.

10 7. The apparatus of claim 1, wherein said plurality of frequencies are different frequencies.

8. The apparatus of claim 1, wherein one of said plurality of frequencies comprises 2 MHz.

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9. The apparatus of claim 1, wherein one of said plurality of frequencies comprises 27 MHz.

10. The apparatus of claim 1, wherein said plurality of frequencies  
20 comprises a first and second frequency, and said second frequency is a harmonic of said first frequency.

11. The apparatus of claim 1, further comprising storage means operatively connected to said common detection means for storing data provided from said common detection means, said common detection means comprising means for transmitting a value of said sensed associated characteristics of a first  
5 generated power output at a first frequency to said storage means for storing said sensed value as data.

12. A method for measuring characteristics of radio frequency energy delivered in an industrial radio frequency processing system comprising:

10 generating a first power output onto a transmission means at a first frequency, said first power output having associated characteristics;

generating a second power output onto said transmission means at a second frequency, said second power output having said associated characteristics;

15 sensing said associated characteristics on said transmission means at said first frequency;

switching to said second frequency; and

sensing said associated characteristics on said transmission means at said second frequency using a common sensing means used to sense  
20 said first frequency.

13. The apparatus of claim 12, wherein said radio frequency processing system comprises a semi-conductor processing system.

14. The apparatus of claim 12, wherein said radio frequency processing system comprises an optical disk processing system.

5 15. The method of claim 12, wherein said associated characteristics comprise voltage, current, and phase.

16. The method of claim 12, further comprising the step of combining said first and second power outputs onto a single transmission means.

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17. The method of claim 12, further comprising the step of storing said sensed associated characteristics of said first generated power output at said first frequency.

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18. The method of claim 12, further comprising the step of storing said sensed associated characteristics of said second generated power output at said second frequency.

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19. The method of claim 12, wherein said first and second frequencies are different.

20. The method of claim 12, wherein said first frequency comprises 2 MHz.

21. The method of claim 12, wherein said second frequency comprises 27 MHz.

5 22. The method of claim 12, wherein said second frequency is a harmonic of said first frequency.

23. An apparatus for measuring characteristics of radio frequency energy delivered in an industrial radio frequency processing system comprising:

10 a plurality of generator means for generating a plurality of power outputs onto a single transmission means at a plurality of frequencies, each one of said plurality of outputs having associated characteristics;

a plurality of tuning means for tuning to said plurality of frequencies;

and

15 common detection means for selecting one of said plurality of tuning means and detecting said associated characteristics of said plurality of outputs at the frequency of said selected tuning means.

24. The apparatus of claim 23, wherein said radio frequency processing  
20 system comprises a semi-conductor processing system.

25. The apparatus of claim 23, wherein said radio frequency processing system comprises an optical disk processing system.

26. The apparatus of claim 23, wherein said associated characteristics of said plurality of said outputs comprises voltage, current, and phase.

5 27. The apparatus of claim 23, further comprising a combining means operatively connected to said plurality of generator means for combining said plurality of outputs onto a single transmission means.

10 28. The apparatus of claim 23, wherein said plurality of generator means comprises two generator means, and said plurality of frequencies comprises two frequencies.

15 29. The apparatus of claim 23, wherein said plurality of frequencies are different frequencies.

30. The apparatus of claim 23, wherein one of said plurality of frequencies comprises 2 MHz.

20 31. The apparatus of claim 23, wherein one of said plurality of frequencies comprises 27 MHz.

32. The apparatus of claim 23, wherein one of said plurality of tuning means is tuned to a harmonic frequency of one of said plurality of frequencies.

33. The apparatus of claim 23, further comprising storage means  
 operatively connected to said common detection means for storing data  
 provided from said common detection means, said common detection means  
 5 comprising means for transmitting a value of said sensed associated  
 characteristics of a first generated power output at a first frequency to said  
 storage means for storing said sensed value as data.

34. A method for measuring characteristics of radio frequency energy  
 10 delivered in an industrial radio frequency processing system comprising:  
     generating a first power output onto a transmission means at a  
 first frequency, said first power output having associated characteristics;  
     generating a second power output onto said transmission means  
 at a second frequency, said second power output having said associated  
 15 characteristics;  
     tuning a first tuning means to said first frequency;  
     tuning a second tuning means to said second frequency;  
     selecting one of said tuning means; and  
     sensing said associated characteristics on said transmission  
 20 means at said frequency associated with said selected tuning means.

35. The apparatus of claim 34, wherein said radio frequency processing  
 system comprises a semi-conductor processing system.

36. The apparatus of claim 34, wherein said radio frequency processing system comprises an optical disk processing system.

5 37. The method of claim 34, wherein said associated characteristics comprise voltage, current, and phase.

38. The method of claim 34, further comprising the step of combining said plurality of power outputs onto a single transmission means.

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39. The method of claim 34, further comprising the step of storing said sensed associated characteristics of said first generated power output at a first frequency.

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40. The method of claim 34, further comprising the step of storing said sensed associated characteristics of said second generated power output at said second frequency.

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41. The method of claim 34, wherein said first and second frequencies are different.

42. The method of claim 34, wherein said first frequency comprises 2 MHz.



44. The method of claim 34, wherein said second frequency is a harmonic of  
said first frequency.

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